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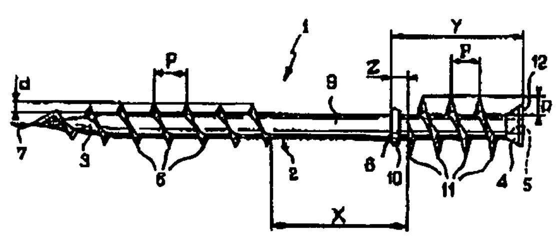
(54) **Vis de fixation et procédés d'assemblage utilisant une telle vis.**
[Fastening screw and assembly procedures using such screw.]

(57) This invention relates to a screw for assembly of two elements placed against one another, of the type comprising a head (4) at the end of a threaded shank (2) equipped with a tapping point (3).

The shank (2) is equipped with a pressure mechanism that is rendered operative by rotating the screw, to press the elements to be assembled against one another. In one embodiment, this pressure mechanism is composed of a radial flange (8) on the shank (2), turned toward the tapping point (3) on which there is a first thread (6). A second thread (11) originates at a predetermined distance from the first (6), in the same direction as the first thread. It is molded on the shank (2) on the other side of the flange (8) with an outside diameter greater than that of the first thread.

Application to the fastening of wood panels or sheets of insulation to walls.



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"Fastening screw and assembly procedures using such screw"

DESCRIPTION

This invention relates to an improved fastening screw, as well as processes for assembly of at least two elements placed against one another, using one or more screws of this type.

Screws of the "wood screw" type are known and have self-drilling and self-tapping properties that allow them to penetrate and form a thread in certain supports such as wood. These screws are also used for masonry supports, which are pre-drilled and the hole equipped with a threaded insert made of a plastic or other material. In that case, the self-tapping property is still used to thread the screw into the insert.

Hereafter, when we speak of two elements attached to one another by a screw, we will call the element that, once assembled, is next to the head of the screw the "assembled element", and the element farther from the head of the screw the "support element" or "support".

Thus, to attach assembled elements such as pieces of wood or sheets of plaster or insulation or other materials, such as wood, metal, or masonry supports, etc., we use screws of the "wood screw" type, embedded through the thickness of the assembled element to the underlying support. When fully embedded, a widened screw head presses strongly against the free surface of the assembled element.

As it is screwed in and tightened in the visible side of the assembled element, the widened head of the screw may affect the esthetics of the assembly. Often, a trace of

the head of the screw appears as a raised or sunken dark spot, through the decorative coating with which the assembled element is then most often covered.

Furthermore, when the medium is soft, like wood, it is not necessary to pre-drill the medium, on the condition that self-drilling screws are used. But even in that case, at least the assembled element must be pre-drilled and countersunk in order to hide the head of the screw. And if the medium is concrete, for example, the support must also be pre-drilled and an insert inserted. In order to receive the insert, the hole in the support has a larger diameter than the hole in the assembled element. This means drilling the support in the absence of the assembled element, which thus prevents using the hole in the assembled element as a guide to drill the support. These operations are relatively tricky and time-consuming, and the results achieved are inaccurate.

Admittedly, there are certain known types of special screws with self-drilling properties for the assembled element as well as self-tapping properties for armatures such as rails or angle brackets, to which assembled elements, such as plaster sheets used for wallboard, are attached. In that case, no pre-drilling is necessary, but the problem of the head of the screw remains.

And all such assemblies using known screws lack sturdiness and may, over varying degrees of time, become loose and even pull out entirely if exposed to repeated mechanical stress, due to the elasticity inherent in the assembled element and/or the play that almost always remains, at least in places, between it and the support. If pressure is exerted on the assembled element in the direction of the support, the head

of the screw, unable to follow the movement, pierces or deteriorates the decorative coating. When the pressure is released, the spring-back of the assembled element can potentially pull the screw out.

Assemblies of thin elements, such as sheets of metal, particularly in automotive vehicles, with self-tapping metal screws pose problems in many similar respects. These screws tend to loosen with vibration.

This invention proposes to remedy all of those drawbacks.

According to the invention, the screw for assembling and tightening an assembled element to a support element, comprising a self-tapping threaded shank between a point and a head equipped with a means of rotationally driving the screw, is characterized by the shank being equipped with a pressure mechanism remote from the head, operated by the rotation of the screw and its corresponding progression through one of the elements, in order to tighten it and/or stress it toward the other element to be assembled. The pressure mechanism eliminates the play between the elements, which affects the rigidity of assemblies assembled with screws of prior art.

In a first embodiment, the pressure mechanism comprises a radial flange on the shank, turned toward the point and toward a first thread between the point and the flange, and a second thread molded on the shank on the other side of the flange, in the same threading direction as the first thread, and with an outside diameter greater than that of the first thread.

This first embodiment of the invention is more particularly intended to implement a process for fastening at least one assembled element, made of a soft material, such as

a panel or sheet of wood or solid insulation, by screwing it widthwise to a support element, such as a wall, into which the thread of the screw taps directly. In this process, the assembled element is placed against the support element and at least one screw, according to the first embodiment, is embedded rotationally, starting at the free surface of the assembled element, until the shank of the screw has completely penetrated both of said elements. It is characterized by the fact that, at the spot where the screw is embedded, the screw used has a distance between the flange and the outer face of the head that is at most equal to the distance between the visible face of the assembled element and the face of the support element turned in the same direction when the two elements are assembled.

The screw is preferably placed without pre-drilling of either element and without countersinking the assembled element.

Since the material of the assembled element is generally softer than that of the support, it is preferable that the thread depth of the second thread on the shank be greater than that of the first thread. This considerably reduces the radial dimensions of the head of the screw and eliminates the risk of damaging the visible face of the assembly at the end of tightening. After a fashion, the second thread replaces the traditional screw head, but with the considerable advantage that it penetrates the assembled element, which hides it and integrates the two items with respect to stresses, which tends to further press the assembled element against the support. Thus, the head of the screw need only have a radial dimension sufficient for rotational connection with a tool.

According to another characteristic, the second thread on the shank of the screw has a pitch smaller than that of the first thread. Thus, when the second thread taps into the assembled element, at the end of screwing, it progressively tightens the assembled element against the support, further strengthening the assembly.

The flange of the screw shank may consist of a radial skirt.

According to a variant embodiment, the flange forms a transition between a first section of the shank on which the first thread is molded and a second section bearing the second thread with a diameter greater than the diameter of the first section. Thus, it is easy to produce large diameter flanges, particularly for screws specially adapted for implementing a fastening process using inserts previously placed in the support by pre-drilling in a single pass through the assembled element and the support.

In a second embodiment, the pressure mechanism comprises a first radial flange on the shank, turned toward the head of the screw, through which the thread emerges, while a second flange is molded opposite the first flange, at a predetermined distance from it.

The second flange is preferably composed of the side of the head of the screw turned toward the point.

In addition, according to one advantageous characteristic, the thread pitch of this screw decreases progressively in the direction of the first flange, at least over a section contiguous to the first flange.

Screws according to this second embodiment are especially intended to implement a process for fastening at least two thin elements, such as sheets of metal, one against the other by screwing widthwise. This process consists of rotationally embedding at least one screw through said elements, characterized by the fact that the screw used

has a distance between the two flanges that is at most equal to the total thickness formed by the elements at the point where the screw is embedded when they are pressed against one another, and by the fact that the screw is turned until the two thin elements escape from its thread through the first flange.

Thanks to the continuity between the thread and the first flange, the thin elements to be assembled successively penetrate between the two screw flanges and are compressed there. The screw then provides a firm and durable assembly of the elements in the manner of a rivet. Furthermore, the fastening will be difficult to reverse by inversely rotating the screw, which eliminates the risk of spontaneous loosening.

This invention will now be described in a more detailed but non-limiting manner with reference to the attached drawings, wherein:

- Figure 1 depicts a side view of a fastening screw in accordance with the first embodiment of the invention;
- Figures 2 through 4 illustrate schematically and on a reduced scale an assembly process using the screw from Figure 1;
- Figure 5 is a side view of a variant embodiment of the screw from Figure 1;
- Figures 6 through 8 illustrate schematically and on a reduced scale an assembly process using the screw from Figure 5;
- Figure 9 is a side view of another variant embodiment of the screw from Figure 1;
- Figure 10 depicts a side view of a fastening screw in accordance with the second

embodiment of the invention;

- Figure 11 is a view similar to Figure 10, illustrating an assembly process using the screw from Figure 10; and
- Figure 12 is a cutaway perspective cross-sectional view of the screw from Figures 10 and 11.

In a manner that is known per se, the fastening screw 1 visible in Figure 1 is a metal screw composed of a threaded cylindrical shank 2 that, in the front, ends in a self-drilling point 3 and, in the rear, bears a head 4 equipped with a slot 5 or other structure to receive the end of a screwdriver. A first self-tapping thread 6 covers approximately the front half of the shank 2 and extends to the point 3 in a cutting bit 7 that contributes to the self-drilling and self-tapping power of the screw.

According to the invention, the shank 2 of the screw 1 has a radial flange 8 that limits a smooth section 9 that it comprises at the rear of the first thread 6. The flange 8 is turned toward the point 3. In Figure 1, this flange 8 is composed of a skirt 10 on the shank 2. Between the skirt 10 and the head 4, the shank 2 also has a second self-tapping thread 11 in the same direction as the first 6. The second thread 11 extends radially beyond the skirt and has a thread depth D that is markedly greater than the standard depth d of the turns of the first thread 6. However, its pitch P is smaller than the pitch p of the first thread 6.

Screws of the type described above with reference to Figure 1 are particularly intended to be used to fasten assembled elements A, such as decorative wood panels, to a support B, composed of an underlying wooden structure or metal rails in a residential space. For that purpose, screws are used that have an axial distance X

between the two threads 6 and 11 at least equal to the thickness E of the assembled element A at the point where the screw is embedded. In addition, the axial distance Y between the flange 8 and the outer face 12 of the head 4 is at most equal to the distance between the face G of the support B turned in the same direction. In the illustrated case, the assembled element is pressed against the support B at the point where the screw is embedded and, consequently, the distance between the faces F and G corresponds to the thickness E.

Another condition for using the screw is that the axial distance Z between the flange 8 and the second thread 11 is at least equal to the thickness E of the assembled element A. This condition is just a consequence of the condition relative to the distance Y in the illustrated case, where the distance between the faces F and G is equal to the thickness E, but it is different from the condition relative to the distance Y when the elements A and B can press against one another only at a point remote from the screw, in which case the distance between the faces F and G is greater than the thickness E at the point where the screw is embedded.

The fastening operation will now be described with reference to Figures 2 through 4.

The assembled element, such as a wood panel A, for example, is placed vertically against the support B, to which it is to be attached. With no pre-drilling of elements A and B and no countersinking of element A, at the intended location of the screw, the screw 1 is embedded through the panel A, starting at its outer surface, in a direction approximately perpendicular to it, using a screwdriver or a screw gun. As shown in Figure 2, each screw driven rotationally engages itself through the entire thickness of the panel A and then penetrates into the support B, thanks to its self-drilling point 3 and its self-tapping thread 6. At a certain stage of the rotational movement of the screw 1 (Figure 3), the skirt 10 on the shank 2 presses against the outer surface of the panel A, and then presses the panel A against the support B, before forcefully entering the hole C made by the first thread 6. This relatively difficult penetration maintains the pressure

pressing the panel A against the support B, as illustrated in Figure 3. Then, the second thread 11 of the shank 2 of the screw 1 in turn engages in the hole C by deeply tapping, in a radial direction, into the wall of the hole C, which has been slightly widened by the skirt 10. When that occurs, the conditions for distances X and Z specified above respectively mandate that the first thread 6 will have cleared the panel A, while the flange 8 has not yet done so. Since the pitch P of the thread 11 is smaller than the pitch p of the thread 6, the screw tends to advance more slowly in the support A than it does in the wall B, and the pressure exerted on the panel A is therefore greater. Screwing stops when the outer face 12 of the head 4 is flush with the visible face F of the panel A. In view of the condition relative to the dimension Y, this occurs without the flange 8 abutting against the support B.

The effect of pressing the panel A against the wall B initially produced by the skirt 10 and then maintained and amplified by the progressive tightening provided by the second thread thanks to its pitch P, which is smaller than the pitch p of the first thread, eliminates all play between the panel A and its support wall B. As in other cases, the panel A always remains integral with the screw 1, thanks to the second thread 11; the resulting assembly is particularly solid and unaffected by compression stress exerted on

the panel A as well as the release of such stress. The heads 4 of the screws 1 no longer need to exert any real compression and therefore their diameter may be decreased in order to reduce them to the slightly tapered shape illustrated in Figure 1. Consequently, there is much less risk of damaging the visible face F of the panel A at the end of tightening, even if that face of the panel A has not been countersunk to receive the head of the screw.

In addition to all of these advantages is the fact that the two threads 6, 11 and the skirt 10 and the head 4 of the screw 1 may be produced without any particular difficulty using common manufacturing techniques known to a person skilled in the art.

The screw 13 depicted in Figure 5 is different from the one that has just been described, simply in that its second thread 14 is on a rear section 15 of the shank 16, whose diameter is markedly greater than the front section 17, which bears the first thread 18. Here, the wide annular surface 19 that joins the two sections 15, 17 of the shank 16 plays the role of the flange 8 on the screw 1 in Figure 1.

The primary advantage of the screw 13 according to this variant embodiment is that it may easily be equipped with a flange 19 with a very large radial width, suitable for using the screw with an insert previously inserted into the support B, as shown in Figures 6 through 8.

In a first step (Figure 6), at the selected site where the screw 13 is to be embedded, a continuous hole K is drilled through the entire thickness of the panel A to an appropriate depth in the support B, against which the panel A is to be placed. The diameter of the hole, made in a single pass through the two elements A and B, is suitable for insertion of the insert L. The insert L is inserted through the hole K in the

assembled element A and installed in the hole K in the support B. In the next step (Figure 7), a screw 13 whose first thread 18 has an outside diameter suitable for mating with the insert L and whose second thread 14 has a larger outside diameter, greater than the inside diameter of the hole K, is engaged by rotating it in the hole K. Once the screw 13 is completely inserted, as depicted in Figure 8, thanks to the compression exerted by its flange 19, confirmed and amplified by the second thread 14, an assembly with the same optimal degree of solidity as the one in Figure 4 is achieved. In this embodiment, as the first thread 18 never taps into the hole K of the assembled element A, there is no specific condition to be met relative to the axial distance X between the two threads. It is not a drawback for the second thread 14 to begin to tap into the hole K of the assembled element A while the first thread 18 has not yet emerged. However, the conditions relative to the distances Y and Z are the same as in the embodiment in Figure 1.

The variant embodiment visible in Figure 9 is designed such that its second thread 20 may have a large outside diameter with, if need be, a large thread depth. This embodiment is more particularly intended for fastening assembled elements made of an extremely soft and frangible material, such as sheets of expanded polystyrene insulation, to any type of support, such as a wall in a residential space. To accomplish this, the second thread 20 of the screw is formed on a central bushing 21, attached to the rear end part of the shank 22. In the illustrated example, the shank 22 belongs to a traditional wood screw, threaded over its entire length. The thread of that wood screw

constitutes the first thread according to the invention. It covers the entire length of the shank. The bushing 21 is threaded internally at the same pitch and it is screwed onto the thread of the shank 22, from the point of the screw to the head 22a, in order to cover the thread of the shank 22 in its rear region. The bushing 21 and the second thread 20 may be made of a plastic material in order to limit the thermal bridge effect through the assembled element A, typically a wood panel. In the case of a bushing 21 made of a plastic material, the bushing 21 may initially be smooth internally and then threaded by the self-tapping thread 18 of the shank 22. Thus, to form a thread of the type depicted in Figure 9, the user need only purchase traditional wood screws and bushings 21 and assemble them. But it is also possible to conceive that the assembly is done in the factory, using one of the aforesaid techniques or, for example, by over-molding the bushing 21 and the thread 20 on the shank 22. A single metal piece may also be manufactured. Conversely, to further limit the thermal bridge effect, the bushing 21 may be blind and used to cap the shank 22, manufactured without a head. In that case, it is the bushing 21 that bears the structure for driving the screw on its closed end. The end of the bushing 21 that is turned toward the point along with the turn 20a of the second thread 20 farthest from the head 22a constitute, at the same time, a compression flange that plays the same role as the flanges 8 and 19 of the screws 1 and 13 described with reference to Figures 1 and 5.

The second thread 20 has a very large thread depth and a very small pitch. If all turns were present, the material of the assembled element could not squeeze between them except in a friable state, if at all. That is why the second thread 20 comprises

only a few isolated turns, separated by gaps in the thread, such that the distance between successive turns is equal to three times the pitch, for example.

Furthermore, the embodiment illustrated in Figure 9 does not meet the condition relative to the axial distance X specified with respect to Figure 1. This is unimportant in view of the intended application: the first thread 18 is so shallow that it practically does not tap into the soft material of the assembled element and, consequently, it is not a drawback if the second thread 20 begins to tap into the insulation, while the first thread 18 is still inside it.

The embodiment of the invention illustrated in Figure 10 is a screw designed to firmly assemble two sheets of metal against one another. The screw comprises a widened flat head 23 at the end of a relatively short threaded shank 24 whose other end is tapered into a special metal-perforating tapping point 25. On the point side of the shank, the head 23 has a radial face 26 forming a flange. According to the invention, the shank 24 has another flange 27 a short distance h from and opposite the face 26 of the head 23. The flange 27 is located at the end of the thread 29 on the shank 24. The thread space of the thread 29 emerges through the flange 27. The flange 27 is produced using a flat extension 28 of the approximately helical rib that forms the thread 29, over about ½ to ¾ turn. The diameter of the extension 28 is slightly smaller than the diameter of the head 23. The diameter at the top of the turns of thread 29 of the shank 24, which runs continuously from the point 25 to the extension 28, increases

progressively from the point to the head of the screw, over a final section 30 adjacent to the extension 28. The thread pitch decreases progressively toward the head 23, over the same section 30.

To assemble two sheets of metal T1, T2 placed against one another, one (or more) screws of the type described above are used, but the groove 31 between the flange 27 and the head 23 has a width b slightly smaller than the total thickness that will result from assembling the two metal sheets. For example, the two metal sheets are engaged in two consecutive turns of the thread of the screw. A circular hole is formed for the shank 24 in each metal sheet and, starting at that hole, a radial slot for passing the rib forming the thread. Rotating the screw causes the metal sheets to move progressively toward the head 23. In the section 30, the metal sheets move closer together due to the decreasing pitch. At the same time, due to its increasing outer diameter, the helical rib of the thread is radially elongated toward the exterior of the radial slot in each metal sheet. After a certain number of turns, the extension 28 in the continuity of the thread 29 reaches the first metal sheet T1 as illustrated by the dot and dash lines in Figure 11, then escapes from that metal sheet, which is then located in the groove 31, as illustrated by the solid line in the same figure. The second metal sheet T2 then does likewise, while first pushing the metal sheet T1 against the inner face 26 of the head 23, and then forcefully entering between it and the flange 27, thanks once again to its elasticity. The two metal sheets T1, T2 are thus strongly compressed between the flange 27 and the head 23 of the screw, as shown by the dot and dash lines in Figure 10. This tightening straightens the twisted edges of the openings that were made in the metal sheets by the tapping thread. This straightening renders said openings unfit for unscrewing by inversely rotating the screw.

Thus, the screws then act like a rivet, forming a firm and durable assembly of the

two metal sheets, regardless of the mechanical stresses on such screws, which then have a particular advantage in the field of automotive construction. The protruding threaded part 29 of the screws may also serve, in other applications, to fasten the assembly of metal sheets T1, T2 to any type of support.

A screw of the type depicted in Figures 10 through 12 may also be used as an anchor point on a single sheet of metal. In that case, there is only one metal sheet, such as T1 or T2, for example, on the floor of the automotive vehicle, whose thickness is slightly greater than the axial dimension of the groove 31. In addition, the head 23, turned toward the interior of the cab of the vehicle, may, for example, bear a snap-on mechanism to attach a floor mat or other floor covering to it.

In addition, the connection between the radially interior edge of the extension 28 and the shank could be eliminated and the extension could have an initial helical shape in order to act as a spring to tighten the metal sheets against one another.

The screw in Figures 10 through 12 could comprise a double thread, such that two thread spaces emerge in two diametrically opposing positions in the groove 31. Thus, the flange 27 would press on the metal sheets T1 and T2 symmetrically on either side of the axis of the shank.

CLAIMS

1. Screw for assembling and tightening elements to one another comprising a self-tapping threaded shank (2; 16; 22; 24) between a point (3; 25) and a head (4; 22a; 23) equipped with a mechanism to rotationally drive the screw, wherein the shank (2; 16; 22; 24) is equipped with a pressure mechanism (8, 11; 19, 14; 20; 26, 27) remote from the head operated by the rotation of the screw and its corresponding progression through one of the elements, in order to tighten it and/or stress it toward the other element to be assembled (A, B; T1, T2).

2. Screw according to Claim 1, wherein the pressure mechanism comprises a radial flange (8) on the shank (2), turned toward the point (3) and toward a first thread (6) between the point and the flange, and a second thread (11) borne by the shank (2) on the other side of the flange (8), in the same threading direction as the first thread, and with an outside diameter greater than that of the first thread.

3. Screw according to Claim 2, wherein the depth (D) of the turns of the second thread (11) on the shank (2) is greater than the depth (d) of the turns of the first thread (6).

4. Screw according to Claim 3, wherein the second thread (20) consists of a helical rib with a large diameter, integrated with the shank (22), whose turn (20a) closest to the first thread forms the radial flange.

5. Screw according to any of Claims 2 through 4, wherein the flange forms a transition between a first section (17) of the shank (16) on which the first thread (18) is molded and a second section (15) bearing the second thread (14) with a diameter greater than the diameter of the first section (17).

6. Screw according to Claim 2 or 3, wherein the second thread (20) is molded on the outer peripheral wall of a bushing (21) attachable to the shank (22); said bushing and/or the second thread, when screwed onto the shank, having one annular end comprising the flange.

7. Screw according to Claim 2 or 3, wherein the flange (8) consists of a radial skirt (10) on the shank (2).

8. Screw according to any of Claims 2 through 7, wherein the second thread (11) on the shank has a pitch (P) smaller than the pitch (p) of the first thread.

9. Screw according to any of Claims 2 through 8, wherein the second thread (20) has at least one gap in the thread.

10. Process for fastening at least one assembled element (A), made of a soft material, such as a panel or sheet of wood or solid insulation, by screwing it widthwise to a support element (B), such as a wall, into which the thread of the screw taps directly. In this process, the assembled element (A) is placed against the support element (B) and at least one screw (1; 13), according to any of Claims 2 through 9, is embedded rotationally, starting at the free surface of the assembled element, until the shank (2; 16) of the screw has completely penetrated both of said elements, wherein, at the spot where the screw is embedded, the screw used has a distance (Y) between the flange (8) and the outer face of the head (4) that is at most equal to the distance between the visible face (F) of the assembled element (A) and the face (G) of the support element (B) turned in the same direction when the two elements are assembled.

11. Process according to Claim 10, wherein the screw used has an axial distance

(X) between the first and second threads on the shank (2; 16) at least equal to the thickness of the assembled element (A) at the point where the screw is embedded.

12. Process according to Claim 10 or 11, wherein the screw is directly embedded through the two elements, which are not pre-drilled.

13. Process for fastening at least one assembled element (A), made of a soft material, such as a panel or sheet of wood or solid insulation, by screwing it widthwise to a support element (B), such as a wall, into which the thread of the screw taps directly. In this process, the assembled element (A) is placed against the support element (B) and at least one screw (1; 13), according to any of Claims 2 through 9, is embedded rotationally, starting at the free surface of the assembled element, until the shank (2; 16) of the screw has completely penetrated both of said elements, wherein a continuous hole (K) is drilled through the thickness of the assembled element (A) and into the support element, an insert (L) is inserted into the hole (K) in the support element by passing it through the hole in the assembled element (A), and the screw (13) is embedded such that its first thread mates with the insert and its second thread, whose diameter is greater, mates with the wall of the assembled element consisting of the hole.

14. Screw according to Claim 1, intended to tighten a structure with at least one element, whose total anticipated thickness at the site where the screw is to be embedded is smaller than the length of the screw, wherein the pressure mechanism comprises a first radial flange (27) on the shank, turned toward the head (23) of the screw, through which the thread emerges, while a second flange (26) is molded

opposite the first flange (27), at a predetermined distance (h) from it.

15. Screw according to Claim 14, wherein at least at one section (30) contiguous to the first flange (27), the thread has an outside diameter that progressively increases in the direction of the head until it is approximately equal to the diameter of the first flange.

16. Screw according to Claim 14 or 15, wherein the second flange (26) is composed of the side of the head (23) of the screw turned toward the point.

17. Screw according to any of Claims 14 through 16, wherein the pitch of the thread (29) progressively decreases in the direction of the first flange (27) at least over a section (30) contiguous to that flange.

18. Screw according to any of Claims 14 through 17, wherein it comprises at least a double thread, comprising at least two thread spaces emerging through the first flange at positions regularly distributed around the axis of the shank.

19. Screw according to any of Claims 14 through 18, wherein the first flange is connected to a rib of the thread, but is detached from the shank.

20. Process for fastening several thin elements (T1, T2), such as metal sheets, by screwing them widthwise to one another. This process consists of placing the thin elements in contact with one another and rotationally embedding through them at least one screw according to any of Claims 14 through 19, wherein the screw used has a distance (h) between the two flanges (26, 27) at least equal to the total thickness formed by the elements at the point where the screw is embedded when they are fastened to one another, and wherein the screw is turned until the two thin elements

escape from its thread (29) through the first flange (27).

21. Process for fastening an assembled element to a thin element, wherein a screw according to any of Claims 14 through 19 is rotationally embedded through the thin element, with a distance (h) between the two flanges (26, 27) at least equal to the thickness of the thin element, and then the assembled element is fastened by means of a mechanism borne by the head of the screw.